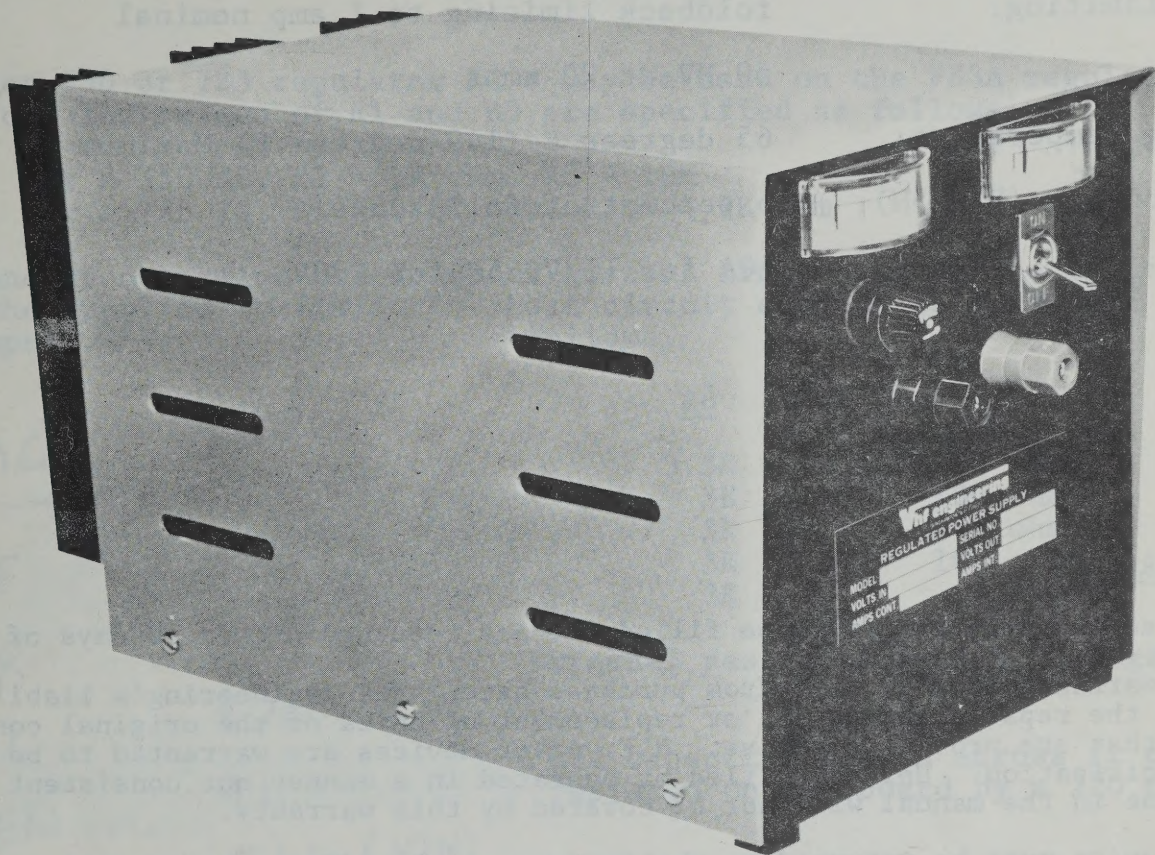


INSTRUCTION MANUAL



PS 25 C/M

INSTRUCTION MANUAL

#5011222

REV.00

PRICE - \$2.00

Vhf engineering

DIVISION OF BROWNIAN ELECTRONICS CORP.

320 WATER ST. / BINGHAMTON, N.Y. 13901 / Phone 607-723-9574

SPECIFICATIONS for PS-25C, PS-25M

Voltage Output:	adjustable 10 to 15 volts
Load Regulation:	2 percent from no load to 20 amps
Current Output:	25 amps for 50 percent duty cycle 14 amps continuous
Current Limiting:	foldback limiting to 1 amp nominal
Ripple:	50 MV at 20 amps
Operating Temperature:	65 degrees C (149 degrees F) Maximum at 14 amps
Meter Accuracy (PS-25M):	5 percent of full scale
Fuse:	10A for 117V, 5A for 220V

LIMITED WARRANTY

The enclosed warranty card must be filled out and returned within 10 days of purchase.

Units are warranted for 90 days from purchase date. VHF Engineering's liability is limited to the repair, adjustment or replacement of units of the original consumer purchaser that are proven defective. R.F. power devices are warranted to be within 1dB of specification. Units modified or operated in a manner not consistent with the instructions in the manual will not be covered by this warranty.

Defective units must be returned to the factory at the address below with a description of the difficulty and the date of purchase. VHF Engineering is not liable for any damage occurring in shipment, so the unit should be packed properly. The customer must pay all shipping costs. Further information may be obtained by calling VHF Engineering's Customer Service Department at (607) 723-9574 (collect calls will not be accepted) or writing:

Customer Service Department
VHF Engineering
320 Water Street
Binghamton, New York 13901

The consumer must pay all shipping costs.

No other warranties are expressed or implied. VHF Engineering is not responsible for damages which result as a consequence of or incident to using this unit.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which may vary from state to state.

ADDENDUM TO:
 PS3012
 PS25 Series
 PS15
 PS3A
 Repeater Manuals

Either 550 or 723 regulator IC's may be used on the PS3A regulator board. The values of R1 and R3 are specified as follows:

for a 550 IC, R1 = 1K ohm, R3 = 10K
 for a 723 IC, R1 = 5.6K ohm, R3 = 4.7K ohm

R5 and R6 determine the foldback current limiting characteristics of the supplies to limit the short circuit current to less than 2 amps. They are specified as follows:

	<u>R5</u>	<u>R6</u>	<u>R7</u>
PS3012	330 ohm	3.3K	100 ohm
PS25 Series	330 ohm	3K	100 ohm
PS15	390 ohm	3K	100 ohm
Repeaters	390 ohm	3K	100 ohm
PS3A Modules	390 ohm	3K	.1 ohm *

*If the PS3A is used with external pass transistors, change to 100 ohm.

For the PS3012 only, R5 has a 1 mfd capacitor placed across it on the top of the board, and C3 is replaced on the board by a 220 ohm 2 watt resistor.

This sheet is to be included with all of the above manuals.

INSTRUCTION MANUAL

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I. DESCRIPTION

The PS25C/M is a solid state regulated power supply with an internally adjustable operating voltage of 7 to 14 volts. The power supply will provide 2% regulation for load currents up to 20 amperes and is capable of supplying up to 25 amperes with a duty cycle of 50% (a maximum "on" time of 3 minutes). The PS25C/M has an over voltage protection (O.V.P.) device and foldback current limiting. The PS25M, the metered version of the PS-25C, has two edgewise meters; a 0-20 volt DC voltmeter and a 0-30 ampere D.C. ammeter.

II. INSTALLATION

Simply plug the unit into a suitable A.C. outlet and connect the load to the binding posts being careful to observe the proper polarity. If the power supply is located some distance from a high current load, heavy gauge wire (#12 or #10) should be used to prevent apparent loss of regulation due to the voltage drop in supply wires. The unit is preset at the factory to deliver 13.8VDC.

III. OPERATING INSTRUCTIONS

After installation, the power supply need only be switched on or off.

Because the fuse is in the A.C. line, it is recommended the power supply be unplugged when changing fuses. The fuse should be rated at 10 amperes for 110 volts (5 amperes for 220 volt unit).

It is important to ensure that the total load attached to the power supply is within its ratings. Those loads near the upper limits of the ratings may exceed the power supply ratings during turn-on (especially tube type equipment where tube and lamp filaments may represent a lower resistance when cold). Be sure to read the paragraphs related to foldback current limiting as detailed in the Theory of Operation Section.

IV. THEORY OF OPERATION

The center tapped secondary of the power transformer is connected to dual diode D1 to form a full wave rectifier. The rectified D.C. from D1 is filtered by a large filter capacitor C1 and fed to the pass transistor assembly and the regulator circuit (PS3A).

The heart of the regulator circuit is the NE550 or 723 precision voltage regulator I.C. It contains a precision zener reference voltage, an error amplifier, an on-chip pass transistor, and current-foldback, transistor network. The reference voltage is compared to a portion of the power supply's output voltage (V_s) determined by R1, R2, and R3. The error amplifier amplifies any

difference and applies a correction voltage to the on-chip pass transistor to raise or lower the output voltage, as required, until the desired output voltage is maintained.

To provide greater current capacity, external pass transistors are connected into the circuit. A TIP3055 transistor is used to bring the current capacity to a level necessary to drive the pass transistor assembly. The pass transistor assembly consists of four transistors connected in parallel with small valued resistors in the emitter leads to provide correct equalization.

Foldback current limiting is provided to limit the output current of the supply in the event of an accidental short circuit. The foldback circuit, in essence, monitors the impedance of the load. When this circuit sees too low an impedance, such as a short circuit, the output current is reduced to a low continuous value of about 1 amp.

Foldback limiting is a valuable safety feature in a power supply since it can prevent malfunctioning equipment from being damaged by excessive currents. The foldback circuitry can, however, be fooled under some circumstances and power supply oscillations can occur. Consider the case where a high power amplifier is being powered by the supply. Assume that the amplifier draws 26 amps during startup and has a relay in its supply lead. When the relay pulls in, the amplifier will attempt to draw 26 amps, but the foldback limiting current will lower the supply voltage to limit the current to 1 amp. The relay will drop out, the foldback circuit will put the supply back to normal, the relay will pull in again causing the amplifier to attempt to draw 26 amps, the foldback circuit will reduce the voltage, and so on. The output voltage of the power supply-amplifier combination will now be oscillating.

Oscillations of this type can be prevented by making sure that startup and operating loads are below the rated current for the supply. Continuing oscillations of this type may cause the over-voltage protection circuitry to short the output of the supply to ground.

The over-voltage protection device (the O.V.P.) protects the equipment being powered in the event of a power supply malfunction. If the power supply voltage exceeds 15V, the output of the supply will be shorted to ground. The O.V.P. will also operate if series of pulses greater than 15V is generated by the load. If unwanted O.V.P. triggering should occur, turn the supply off for 1 minute to reset the O.V.P.

V. ADJUSTMENT

1. Unplug the power cord. Remove the six #6 x 3/8 self tapping screws on the side of the cover which hold the cover to the chassis. Remove the cover.
2. Set the voltage adjust control (R-2) on the regulator circuit board to mid position.
3. Connect a volt meter to the output terminals. Set the meter to read 20-50 volts full scale. Use the panel meter for the PS25M.
4. Plug in supply and turn switch on. Adjust R-2 for a nominal 13.8 volts output.
5. If the control is adjusted above 15 volts, the O.V.P. will shut down the supply. The O.V.P. is reset by turning off the supply for approximately one minute (be sure to reset control to mid position).
6. Turn the supply off and unplug the power cord.
7. Place the cover on the chassis with the beveled end toward the front. Line up the mounting holes with the Tinnerman fasteners and secure the cover using six #6 x 3/8 self tapping screws.

VI. SERVICING

NO OUTPUT

1. Check fuse or circuit breaker.
2. The over-voltage protection device may be shutting down the supply as soon as it is turned on. To reset the O.V.P.: Turn the power off - wait about one minute for the filter capacitor to discharge - turn the regulator pot down (see Adjustment Section) - reapply power - adjust the regulator pot for the desired output voltage.
3. Measure voltage across filter capacitor.
 - a.) If 22-25 VDC is present, proceed to step 7.
 - b.) If no voltage is present, proceed to step 4.
4. Check the bridge rectifier for shorts or open.
5. Check the power cord continuity.
6. Check the transformer primary and secondary for continuity.

7. Measure the voltage at the base of the pass transistor on the PS3A card. This measurement can be made at the "VO" terminal.
 - a.) If no voltage is present, proceed to step 10.
 - b.) If 12-24 volts is present, proceed to step 8.
8. Check the pass transistor on the PS3A card for open junctions.
9. Check the .1 ohm resistors for open circuit.
10. Measure the voltage at the base of Q1.
 - a.) If the reading is 12-24 volts, Q1 may be defective (see test chart below). Check carefully for cold solder joints.
 - b.) If the reading is 0 volts, proceed to step 11.
11. Check the voltage at IC1 pin 4.
 - a.) If the reading is over 1.6 volts, check R1, R2 and R3 for open.
 - b.) If the reading is below 1.6 volts, check the voltage on IC1 pins 11 and 12. If it is between 22-24 volts, IC1 may be bad. If it is 0 volts, check for open land or cold solder joints on circuit board.

VOLTAGE DROP UNDER LOAD

1. Reduce the load and recheck the output voltage. The current limit will reduce the output voltage if a load greater than the supply can handle is applied (see "Theory of Operation").
2. Check the voltage across the filter capacitor (C1) under load.
 - a.) If the reading is under 20 volts, proceed to step 4.
 - b.) If the reading is 20-24 volts, proceed to step 3.
3. Check the solder connections to the front panel output terminals. Be sure that the screws which hold the PS3 in place are tight.
4. Check diode D1 for an open junction.
5. Check the solder connections between the transformer and rectifier.
6. Be sure that the screws which hold the PS3 in place are tight.
7. Check Q1 for an open junction (see chart below). If Q1 checks good, IC1 may be bad.

EXCESSIVE RIPPLE OR HUM

1. Be sure that the screws which hold the PS3 in place are tight.
2. Check the bridge rectifier for open or shorted diodes.
3. Check line voltage. Excessively low line voltage may cause hum under heavy loads. Lowering the output voltage of the supply may correct this problem.

VII. CUSTOMER SERVICE

VHF Engineering's Customer Service department will assist customers with technical problems concerning all VHF Engineering units. If you have a query, please contact the Customer Service Department at (607) 723-9574. Units having serious problems may be returned postpaid to the factory without authorization for evaluation and repair estimates with a note detailing the difficulty. Units qualifying for warranty service will be covered according to the warranties detailed in their manuals. For units not covered by a warranty, a nominal service fee plus parts and return postage will be charged. Units returned for service should be sent to:

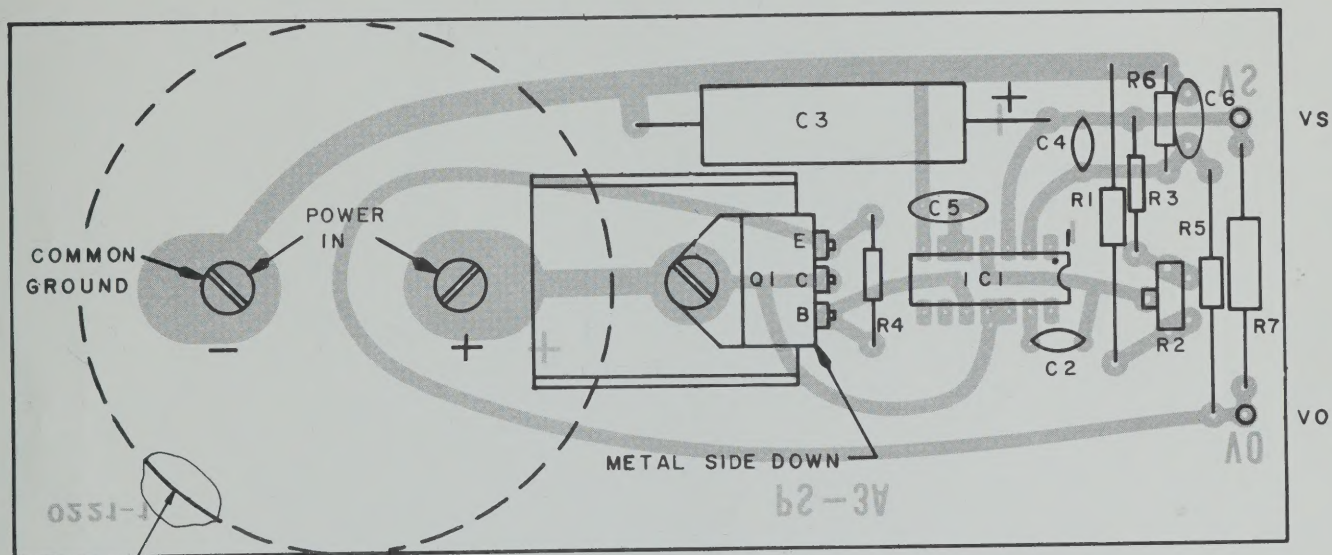
Customer Service Department
VHF Engineering
320 Water Street
Binghamton, New York 13901

PARTS LIST

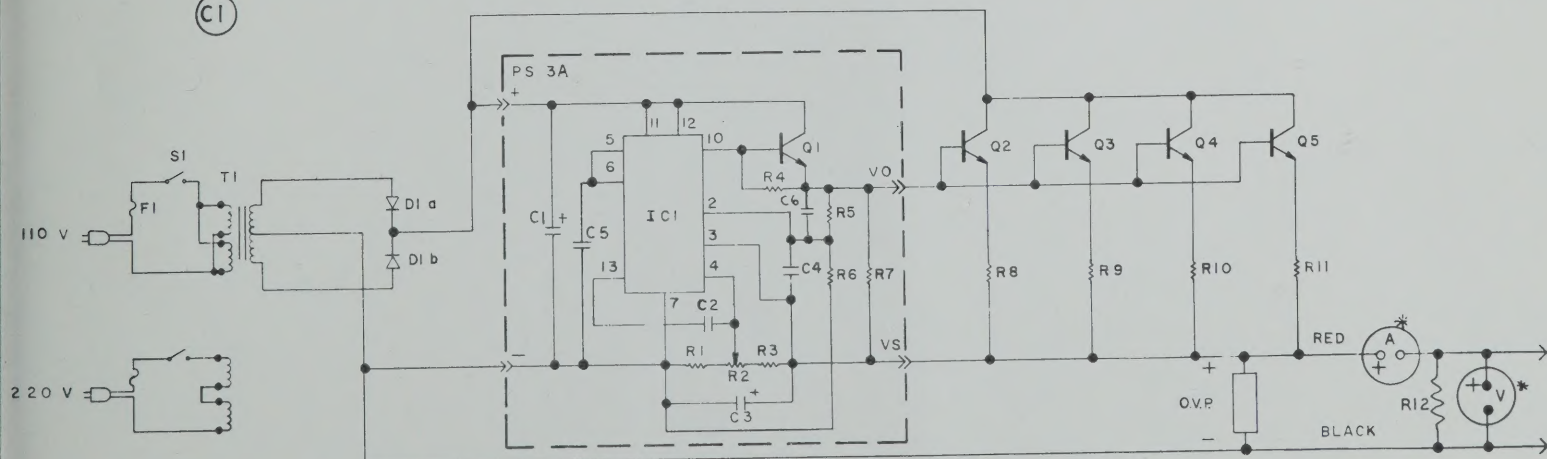
C 1	25000 MFD 40 volt	2010610	R 1	1K 5%	2020230
C 2	.001	2010370	R 2	2K Pot	2020510
C 3	470 MFD 16 volt	2010570	R 3	10K 5%	2020329
C 4	.001	2010370	R 4	5.6K $\frac{1}{2}$ W	2020300
C 5	.01	2010410	R 5	330 ohm 5%	2020175
C 6	.01	2010410	R 6	3K 5%	2020261
D 1	30 amp PIV Rectifier	1010120	R 7	100 ohm 1W	2020110
IC 1	NE555	1050050	R 8	.1 ohm 5W	2020010
Q 1	TIP 3055	1020060	R 9	.1 ohm 5W	2020010
Q 2	2N3055 or Equiv.	1020050	R10	.1 ohm 5W	2020010
Q 3	2N3055	1020050	R11	.1 ohm 5W	2020010
Q 4	2N3055	1020050	R12	220 ohm 2W	2020140
Q 5	2N3055	1020050	S 1	SPST Switch	3010050
	P.C. Board	4040220	T 1	Power Transformer	4010020
	Hardware, Heat Sinks,			36V CT @ 25 amps	
	Chassis and Wire			110/220 volt primary	

FOR PS25M ONLY

1	Edge Reading D.C. Ammeter (0-30 amperes)	3050390
1	Edge Reading D.C. Voltmeter (0-20 volts)	3050391
1	PS25M Chassis	4030120



PS 3A COMPONENT VIEW



* = FOR PS25M ONLY.

Paging Codes

N6RNF	976
N6K4R	357
N6TQL	820
KB6OEN	911
N6WJH	566 (JON)
KK6DJ	250.3
K16WO	2461 (NOT PLI ITS DTMF!)
KC6WOT	915
KB6 DMH	103.5

